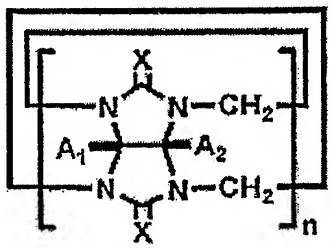
CLAIMS

1. Nanoparticles prepared by the aggregation of cucurbituril derivatives of Formula 1 below and having a particle size of 1 to 1,000 nm:



(1)

wherein X is O, S, or NH;

A_1 and A_2 are respectively OR^1 and OR^2, SR^1 and SR^2, or NHR^1 and NHR^2;

R^1 and R^2 are each independently selected from the group consisting of hydrogen, a substituted or unsubstituted alkyl of C_1-C_{30}, a substituted or unsubstituted alkenyl of C_2-C_{30}, a substituted or unsubstituted alkynyl of C_2-C_{30}, a substituted or unsubstituted carbonylalkyl of C_2-C_{30}, a substituted or unsubstituted thioalkyl of C_1-C_{30}, a substituted or unsubstituted alkylthiol of C_1-C_{30}, a substituted or unsubstituted alkoxy of C_1-C_{30}, a substituted or unsubstituted hydroxyalkyl of C_1-C_{30}, a substituted or unsubstituted alkylsilyl of C_1-C_{30}, a substituted or unsubstituted aminoalkyl of C_1-C_{30}, a substituted or unsubstituted aminoalkylthioalkyl of C_1-C_{30}, a substituted or unsubstituted cycloalkyl of C_5-C_{30}, a substituted or unsubstituted heterocycloalkyl of C_2-C_{30}, a substituted or unsubstituted aryl of C_6-C_{30}, a substituted or unsubstituted arylalkyl of C_6-C_{20}, a substituted or unsubstituted heteroaryl of C_4-C_{30}, and a substituted or unsubstituted heteroarylalkyl of C_4-C_{20}; and

n is an integer of 4 to 20.

2. The nanoparticles of claim 1 prepared by the aggregation of a biodegradable polymer in addition to the cucurbituril derivatives.

3. The nanoparticles of claim 2, wherein the biodegradable polymer is poly(lactide-co-glycolide) (PLGA), polyethyleneglycol (PEG), poly(alkylcyanoacrylate), poly-ε -caprolactone, cellulose derivative, albumin, gelatin, alginate, or a mixture

thereof.

4. A pharmaceutical composition in which a pharmaceutically active substance as a guest molecule is loaded into the nanoparticles of any one of claims 1 through 3.

5. The pharmaceutical composition of claim 4, wherein the pharmaceutically active substance is an organic compound, a protein, or a gene.

6. The pharmaceutical composition of claim 5, wherein the organic compound is hydrocortisone, prednisolone, spironolactone, testosterone, megesterol acetate, danasole, progesterone, indomethacin, amphotericin B, or a mixture thereof.

7. The pharmaceutical composition of claim 5, wherein the protein is human growth hormone, G-CSF (granulocyte colony-stimulating factor), GM-CSF (granulocyte-macrophage colony-stimulating factor), erythropoietin, vaccine, antibody, insulin, glucagon, calcitonin, ACTH (adrenocorticotropic hormone), somatostatin, somatotropin, somatomedin, parathyroid hormone, thyroid hormone, hypothalamus secretion, prolactin, endorphin, VEGF (vascular endothelial growth factor), enkephalin, vasopressin, nerve growth factor, non-naturally occurring opioid, interferon, asparaginase, alginase, superoxide dismutase, trypsin, chymotrypsin, pepsin, or a mixture thereof.

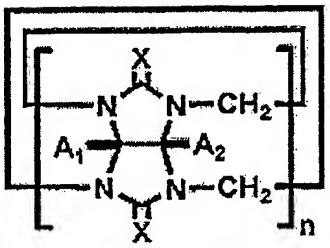
8. A method of preparing the nanoparticles of claim 1, which comprises:

dissolving a cucurbituril derivative of Formula 1 below in an organic solvent to obtain a reaction solution;

adding water to the reaction solution followed by dispersing;

distilling the dispersed solution in a temperature range from a boiling point of the organic solvent to 100℃ to remove the organic solvent; and

cooling the resultant solution to room temperature:



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n is an integer of 4 to 20.

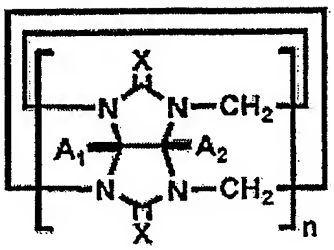
9. A method of preparing the pharmaceutical composition of claim 4, which comprises:

dissolving a cucurbituril derivative of Formula 1 below and the pharmaceutically active substance in an organic solvent to obtain a reaction solution;

adding water to the reaction solution followed by dispersing;

distilling the dispersed solution in a temperature range from a boiling point of the organic solvent to 100℃ to remove the organic solvent; and

cooling the resultant solution to room temperature:



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n is an integer of 4 to 20.

10. The method of claim 8 or 9, wherein in dissolving the cucurbituril derivative in the organic solvent to obtain the reaction solution, a biodegradable polymer is further dissolved in the organic solvent.

11. The method of claim 8 or 9, wherein the organic solvent is chloroform, dimethylsulfoxide, dichloromethane, dimethylformamide, tetrahydrofuran, or a mixture thereof.

12. The method of claim 8 or 9, wherein the dispersing is carried out by sonication with a sonicator.